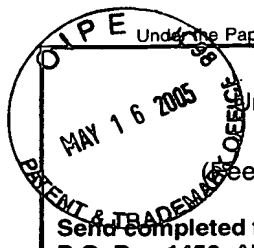


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**PETITION FEE**

Under 37 CFR 1.17(f), (g) &amp; (h)

**TRANSMITTAL**

(Fees are subject to annual revision)

Send completed form to: Commissioner for Patents  
P.O. Box 1450, Alexandria, VA 22313-1450

Application Number	10/828,286
Filing Date	April 21, 2004
First Named Inventor	Hiroataka NAKAGAWA et al.
Art Unit	2186
Examiner Name	Not yet assigned
Attorney Docket Number	501.43788X00

**Enclosed is a petition filed under 37 CFR 1.102(d) that requires a processing fee (37 CFR 1.17(f), (g), or (h)). Payment of \$ 130.00 is enclosed.**

This form should be included with the above-mentioned petition and faxed or mailed to the Office using the appropriate Mail Stop (e.g., Mail Stop Petition), if applicable. For transmittal of processing fees under 37 CFR 1.17(i), see form PTO/SB/17i.

**Payment of Fees** (small entity amounts are NOT available for the petition (fees))

- ☒ The Commissioner is hereby authorized to charge the following fees to Deposit Account No. 50-1417:
- ☐ petition fee under 37 CFR 1.17(f), (g) or (h) ☒ any deficiency of fees and credit of any overpayments
- Enclose a duplicative copy of this form for fee processing.
- ☐ Check in the amount of \$ \_\_\_\_\_ is enclosed.
- ☒ Payment by credit card (From PTO-2038 or equivalent enclosed). Do not provide credit card information on this form.

**Petition Fees under 37 CFR 1.17(f):****Fee \$400****Fee Code 1462**

For petitions filed under:

- § 1.53(e) - to accord a filing date.  
 § 1.57(a) - to according a filing date.  
 § 1.182 - for decision on a question not specifically provided for.  
 § 1.183 - to suspend the rules.  
 § 1.378(e) for reconsideration of decision on petition refusing to accept delayed payment of maintenance fee in an expired patent.  
 § 1.741(b) - to accord a filing date to an application under §1.740 for extension of a patent term.

**Petition Fees under 37 CFR 1.17(g):****Fee \$200****Fee code 1463**

For petitions filed under:

- §1.12 - for access to an assignment record.  
 §1.14 - for access to an application.  
 §1.47 - for filing by other than all the inventors or a person not the inventor.  
 §1.59 - for expungement of information.  
 §1.103(a) - to suspend action in an application.  
 §1.136(b) - for review of a request for extension of time when the provisions of section 1.136(a) are not available.  
 §1.295 - for review of refusal to publish a statutory invention registration.  
 §1.296 - to withdraw a request for publication of a statutory invention registration filed on or after the date the notice of intent to publish issued.  
 §1.377 - for review of decision refusing to accept and record payment of a maintenance fee filed prior to expiration of a patent.  
 §1.550(c) - for patent owner requests for extension of time in ex parte reexamination proceedings.  
 §1.956 - for patent owner requests for extension of time in inter partes reexamination proceedings.  
 § 5.12 - for expedited handling of a foreign filing license.  
 § 5.15 - for changing the scope of a license.  
 § 5.25 - for retroactive license.

**Petition Fees under 37 CFR 1.17(h):****Fee \$130****Fee Code 1464**

For petitions filed under:

- §1.19(g) - to request documents in a form other than that provided in this part.  
 §1.84 - for accepting color drawings or photographs.  
 §1.91 - for entry of a model or exhibit.  
 §1.102(d) - to make an application special.  
 §1.138(c) - to expressly abandon an application to avoid publication.  
 §1.313 - to withdraw an application from issue.  
 §1.314 - to defer issuance of a patent.

Name (Print/Type)	Frederick D. Bailey	Registration No. (Attorney/Agent)	42,282
Signature		Date	May 16, 2005

This collection of information is required by 37 CFR 1.114. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.



Docket No.: 501.43788X00

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re the Application of:

Hirofaka NAKAGAWA et al.

Serial No. 10/828,286

Filed: April 21, 2004

For: METHOD, DEVICE AND PROGRAM FOR MANAGING VOLUME

**PETITION TO MAKE SPECIAL  
UNDER 37 CFR §1.102(MPEP §708.02)**

May 16, 2005

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Applicants hereby petition the Commissioner to make the above-identified application special in accordance with 37 CFR §1.102(d). Pursuant to MPEP §708.02(VIII), Applicants state the following.

(A) This Petition is accompanied by the fee set forth in 37 CFR §1.17(h). The Commissioner is hereby authorized to charge any additional payment due, or to credit any overpayment, to Deposit Account No. 50-1417.

(B) All claims are directed to a single invention. If the Office determines that all claims are not directed to a single invention, Applicant will make an election without traverse as a prerequisite to the grant of special status.

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(C) A pre-examination search has been conducted.

The search was directed to the invention set forth in claims 1-20 in the above referenced application. The invention relates to a method of managing volumes of a plurality of storage systems, by a management computer connected via a network to the plurality of storage systems having volumes connected to a computer via a network and storing data used by the computer, the method includes: keeping a correspondence between a level indicating a specific performance of a volume, and storage system characteristics of the storage system; obtaining from a first storage system a level indicating a performance of a volume allocated to the computer by the first storage system; and referencing the storage system characteristics of the first storage system that corresponds to the obtained level indicating the performance of the volume and storage system characteristics of another storage system that corresponds to the obtained level indicating the performance of the volume, respectively, and comparing the performances of the volumes of the respective storage systems against each other.

The search of the above features was conducted in the following areas: Class 707, subclasses 10, 202, 203, 204 and 205, class 709, subclasses 201 and 231, class 711, subclass 114, 154, 161, 162, ,165 and 170, and class 714, subclasses 5, 6 and 7.

Additionally, a computer database search was conducted on the USPTO system EAST.

(D) The following is a list of the references deemed most closely related to the subject matter encompassed by the claims:

<u>U.S. Patent Number</u>	<u>Inventors</u>
4,310,883	Clifton et al.
5,345,584	Hill
6,389,432	Pothapragada et al.
6,598,174	Parks et al.
6,766,430	Arakawa et al.
6,836,832	Klinkner

<u>U.S. Patent Publication No.</u>	<u>Inventor(s)</u>
2004/0024796	Takeda et al.
2004/0123180	Soejima et al.
2004/0181641	Nguyen et al.
2004/0268069	Satoyama et al.

A copy of each of these references (as well as other references uncovered during the search) is enclosed in an accompanying IDS.

(E) It is submitted that the present invention is patentable over the references for the following reasons.

It is submitted that the cited references, whether considered alone or in combination, fail to disclose or suggest the invention as claimed. In particular,

the cited references, at a minimum, fail to disclose or suggest referencing the storage system characteristics of the first storage system that corresponds to the obtained level indicating the performance of the volume and storage system characteristics of another storage system that corresponds to the obtained level indicating the performance of the volume, and/or comparing the performance of the volumes of the respective storage systems against each other, and/or giving an instruction to a different storage system from the storage system having the volume that is already allocated to the host computer, to allocate a volume corresponding to the level, and/or a storage system volume allocation unit allocating to the host computer a volume having the performance corresponding to the level based on the allocation in.

All of the independent claims recite at least one of these features or this feature, if there is only one. In particular, independent claim 1 recites keeping a correspondence between a level indicating a specific performance of a volume, and storage system characteristics of the storage system, and referencing the storage system characteristics of the first storage system that corresponds to the obtained level indicating the performance of the volume and storage system characteristics of another storage system that corresponds to the obtained level indicating the performance of the volume, respectively, and comparing the performance of the volumes of the respective storage systems against each other. Independent claim 11 recites keeping a correspondence between a level indicating a specific performance of a volume and a storage system characteristics indicating a performance of the storage systems, obtaining a level

indicating a specific performance of a volume of the first storage system, and a level indicating a specific performance of a volume of the second storage system connected to the volume of the first storage system, and comparing the storage system characteristics corresponding to the obtained level. Independent claim 16 recites a memory for keeping a correspondence between a level indicating a specific performance of the volume, and storage system characteristics of the storage system, for each of the storage systems, and where the control unit obtains the level indicating the specific performance of the volume of the other storage system, references the storage system characteristics of the first storage system and the other storage system corresponding to the level based on the correspondence, and compares the referenced values. Independent claim 18 recites a sequence of obtaining correspondences between levels indicating a specific performance of volume, and storage system characteristics of the storage system, and referencing the storage system characteristics of the first storage system corresponding to the obtained level indicating the performance of the volume, and storage system characteristics of another storage system, and comparing the performances of the volumes of the respective storage systems against each other. Independent claim 20 recites references the correspondences of the plurality of storage systems, compares the storage system characteristics of the plurality of storage systems corresponding to the level, and based on the result of the comparison, gives an instruction to a different storage system from the storage system having the volume that is already allocated to the host computer, to allocate a volume corresponding to the

level; and the storage system volume allocation unit allocates to the host computer a volume having the performance corresponding to the level based on the allocation instruction.

The references considered most closely related to the claimed invention are briefly discussed below:

**U.S. Patent No. 4,310,883 (Clifton et al.)**, discloses a mass storage system that selects a destination storage volume according to specific performance criteria, such as the memory space efficiency, the volume life expectancy, the numbers of users, the shareability of the volume, and the status of the volume. The system sorts the volumes according to each volume's match and risk factors to the data set to be stored. The volumes that best meet the performance requirements are selected for data transfer and storage operations. A host computer performs allocation requests, and based on the requests, the best volume or volumes are selected for storage. (See, e.g., Abstract and column 4, line 64, through column 5, line 21.) However, unlike the present invention, Clifton et al. do not disclose a method for obtaining from a first storage system a level indicating a performance of a volume allocated to the computer by the first storage system; and referencing the storage system characteristics of the first storage system that corresponds to the obtained level indicating the performance of the volume and storage system characteristics of another storage system, respectively, and comparing the performances of the volumes of the respective storage systems against each other.

**U.S. Patent No. 5,345,584 (Hill)** discloses a method for managing the allocation of data sets among a plurality of storage devices, and selecting the storage devices based on the storage volume and the access capability that most nearly meets the requirements of the data to be stored. The invention also calculates a machine storage factor, a residual storage factor, and allocates the data to a storage device that has sufficient available space and whose performance most nearly matches and exceeds the performance required by the data to be stored. (See, e.g., Abstract and column 3, line 67, through column 4, line 24.) However, unlike the present invention, Hill does not disclose a method for obtaining from a first storage system a level indicating a performance of a volume allocated to the computer by the first storage system; and referencing the storage system characteristics of the first storage system that corresponds to the obtained level indicating the performance of the volume and storage system characteristics of another storage system, respectively, and comparing the performances of the volumes of the respective storage systems against each other.

**U.S. Patent No. 6,389,432 (Pothapragada et al.)** discloses a system and a method for managing storage space in one or more data storage devices. A request for storage space is made by a requester, and the request specifies certain criteria associated with the requested storage space, a table containing



storage space attributes is searched, and a data storage space whose attributes best match the specified criteria is selected to become the storage location. (See, e.g., Abstract, and column 1, line 60, through column 2, line 4.) However, unlike the present invention, Pothapragada et al. do not disclose a method for obtaining from a first storage system a level indicating a performance of a volume allocated to the computer by the first storage system; and referencing the storage system characteristics of the first storage system that corresponds to the obtained level indicating the performance of the volume and storage system characteristics of another storage system, respectively, and comparing the performances of the volumes of the respective storage systems against each other.

**U.S. Patent No. 6,598,174 (Parks et al.)** discloses a method and apparatus used in a storage network for replacing a storage device that is about to experience a failure condition. The system monitors the conditions of the first storage device, and once it is detected that the first storage device is about to fail, a secondary storage device is selected that can be used as a replacement, then replaces a storage device that is about to fail with a secondary storage device. The method for detecting a condition of a first storage device includes monitoring such things as whether the device is about to fail, or whether the device is suffering from a reduced performance. Once a particular spare storage device has been selected, the data stored in the first storage device is migrated to the second storage device, and the second storage device replaces the first

storage device in the non-redundant array. (See, e.g., Abstract and column 3, lines 16-47.) However, unlike the present invention, Parks et al. do not disclose a method for obtaining from a first storage system a level indicating a performance of a volume allocated to the computer by the first storage system; and referencing the storage system characteristics of the first storage system that corresponds to the obtained level indicating the performance of the volume and storage system characteristics of another storage system, respectively, and comparing the performances of the volumes of the respective storage systems against each other.

**U.S. Patent No. 6,766,430 (Arakawa et al.)** discloses a method and system for reallocating data from one storage location to another storage location. A host collects usage information from a plurality of storage systems, and determines the relocation destination LU for the data. The relocation destination LU is selected based on specified requirements, including performance conditions and level of reliability. The destination LU may have a higher performance than the primary LU, so that the reallocation increases the processing capacity of the pertinent LU, so that the performance of the computer system is improved. (See, e.g., Abstract and column 21, lines 42-51.) However, unlike the present invention, Arakawa et al. do not disclose a management computer connected via a network to the plurality of storage systems having volumes connected to a computer via a network and storing data used by the computer.

**U.S. Patent No. 6,836,832 (Klinkner)** discloses a system and method for selecting disks for use with a volume within a storage system based on suitable performance characteristics. The disks are pre-selected based on a disk table that contains performance characteristics of all the disks affiliated with the storage system and a volume table that contains the characteristics of all the volumes served by the storage system. (See, e.g., Abstract, column 3, lines 6-36, and column 11, lines 36-50.) However, unlike the present invention, Klinkner does not disclose a method for obtaining from a first storage system a level indicating a performance of a volume allocated to the computer by the first storage system; and referencing the storage system characteristics of the first storage system that corresponds to the obtained level indicating the performance of the volume and storage system characteristics of another storage system, respectively, and comparing the performances of the volumes of the respective storage systems against each other.

**U.S. Patent Publication No. 2004/0024796 (Takeda et al.)**, discloses a file system in which data is stored on a plurality of volumes in compliance to file storage requests from various applications. The system automatically calculates the storage requirements and determines the storage destination volume on a file by file basis. The storage destination volume is selected in relation to each file specified by a storage request, based on calculated storage requirements, reliability characteristics, or performance characteristics of each volume, and

stores the file to the selected destination storage volume. Typical reliability requirements include the mean time between failure and average operating time. Typical performance requirements include access speed. If two or more storage destination volumes meet the requirements, then the storage volume is selected according to the usage priority defined in the storage destination volume usage priority definition table. (See, e.g., Abstract and paragraphs 14 and 51.)

However, unlike the present invention, Takeda et al. do not disclose a method for obtaining from a first storage system a level indicating a performance of a volume allocated to the computer by the first storage system; and referencing the storage system characteristics of the first storage system that corresponds to the obtained level indicating the performance of the volume and storage system characteristics of another storage system, respectively, and comparing the performances of the volumes of the respective storage systems against each other.

**U.S. Patent Publication No. US 20040123180 (Soejima et al.)** discloses a method and system for remotely copying data from a source volume to a destination volume using a remote copy function, based on two specified conditions. The first condition is determining whether the performance of the destination volume after a failover is equal to or higher than the performance of the source volume before the failover. The second condition is determining whether the performance of the destination volume is equal to or higher than the performance of the source volume during the copying process. If these

conditions are not met, then the storage apparatus that functions as the destination volume is changed in configuration in order to satisfy these conditions. (See, e.g., Abstract and paragraphs 34-39.) However, unlike the present invention, Soejima et al. do not disclose a management computer connected via a network to the plurality of storage systems having volumes connected to a computer via a network and storing data used by the computer.

**U.S. Patent Publication No. 2004/0181641 (Nguyen et al.)** discloses a computer implemented method in a data storage system that responds to a fast copy function, to write data from a source volume to a target volume. The storage system includes a host that responds to a fast copy function, and copies data from a source volume to a target volume. The target volume is automatically selected from a list of available target volumes, based on at least one performance-related criterion and at least one reliability-related criterion. (See, e.g., Abstract and paragraphs 10-11.) However, unlike the present invention, Nguyen et al. do not disclose a method for obtaining from a first storage system a level indicating a performance of a volume allocated to the computer by the first storage system; and referencing the storage system characteristics of the first storage system that corresponds to the obtained level indicating the performance of the volume and storage system characteristics of another storage system, respectively, and comparing the performances of the volumes of the respective storage systems against each other.

**U.S. Patent Publication No. 2004/0268069 (Satoyama et al.)**, discloses a storage system having multiple storage devices with different interfaces and characteristics, and that copies data from a source volume to a destination volume. In choosing a destination volume, the system takes into consideration the characteristics of the source volume. The characteristics may include: the type of storage device on which the source volume resides or how the source volume is allocated to different areas of the cache. The system uses the criteria table that lists the selection criteria of destination volumes and views the destination volumes according to the selection criteria. (See, e.g., Abstract, and paragraphs 8-10.) However, unlike the present invention, Satoyama et al. do not disclose a management computer connected via a network to the plurality of storage systems having volumes connected to a computer via a network and storing data used by the computer.

Therefore, since the references fail to disclose referencing the storage system characteristics of the first storage system that corresponds to the obtained level indicating the performance of the volume and storage system characteristics of another storage system that corresponds to the obtained level indicating the performance of the volume, and/or comparing the performance of the volumes of the respective storage systems against each other, and/or giving an instruction to a different storage system from the storage system having the volume that is already allocated to the host computer, to allocate a volume corresponding to the level, and/or a storage system volume allocation unit

allocating to the host computer a volume having the performance corresponding to the level based on the allocation in, it is submitted that all of the claims are patentable over the cited references.

### **CONCLUSION**

Applicant has conducted what it believes to be a reasonable search, but makes no representation that "better" or more relevant prior art does not exist. The Patent Office is urged to conduct its own complete search of the prior art, and to thoroughly examine this application in view of the prior art cited herein and any other prior art that the Patent Office may locate in its own independent search. Further, while Applicant has identified in good faith certain portions of each of the references listed herein in order to provide the requisite detailed discussion of how the claimed subject matter is patentable over the references, the Patent Office should not limit its review to the identified portions but rather, is urged to review and consider the entirety of each reference, and not to rely solely on the identified portions when examining this application.

In view of the foregoing, Applicant requests that this Petition to Make Special be granted and that the application undergo the accelerated examination procedure set forth in MPEP 708.02 VIII.

Respectfully submitted,

MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C.



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